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6. AUTHOR(S) Lt Jon C. Bradford			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) OC-ALC/LABE 3001 Staff Dr Ste 2AB85A Tinker AFB OK 73145-3006		8. PERFORMING ORGANIZATION REPORT NUMBER	
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13. ABSTRACT (Maximum 200 words) B-1B aircraft 85-0085 arrived 29 Jul 96 for PDM. Aircraft experienced intermittent electrical failures during Functional Check Flight (FCF) on 27 Nov 96. Troubleshoot defect and conducted Operational Check Flight (OCF) on 7 Dec 96. Intermittent failure reoccurred during flight. Extensive troubleshooting identified several defective electrical power components which feasibly could have caused the in-flight failure. These components were removed and replaced. Detailed troubleshooting background is included in Section II of the Technical Test Plan (Tab 1). An OCF is scheduled for 10 Jan 97, weather permitting, with FCF to follow 11 Jan 97. After successful FCF, delivery is scheduled for 22 Jan 97.			
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TECHNICAL TEST PLAN
FOR
AIRCRAFT 85-0085
INTERMITTENT POWER FAILURE ANOMALY
FLIGHT
TINKER AFB, OK
9 JANUARY 1997

STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname), GRADE AND DATE		TO	ACTION	SIGNATURE (Surname), GRADE AND DATE
1	OC-ALC/ LAP	Coord	<i>Bickel, Col, 9 Jan 97</i>	6	OC-ALC/ CC	Sig	<i>[Signature]</i>
2	OC-ALC/ LA	Coord	<i>Wetzel, Col (9)</i>	7			
3	OC-ALC/ 10 FLTS	Coord	<i>[Signature] Col USAF 9 JAN 97</i>	8			
4	OC-ALC/ TIE	Coord	<i>[Signature] LTCOL 9 Jan 97</i>	9			
5	OC-ALC/ SE	Coord	<i>[Signature] 9 JAN 97</i>	10			

SURNAME OF ACTION OFFICER AND GRADE

SYMBOL

PHONE

TYPIST'S
INITIALS

SUSPENSE DATE

Jon C. Bradford, 1 Lt, USAF

LABEA

736-4431

jcb

N/A

SUBJECT

B-1B 85-0085 Operational Check Flight (OCF) Approval

DATE

9 Jan 97

SUMMARY

1. A Technical Review Board/Safety Review Board convened 8 Jan 97, and after review of the maintenance actions performed, applicable Test Risk Hazards, and the Flight Procedures presented in the Technical Test Plan, it was their recommendation that the OCF be flown as a Medium Risk Flight due to the remote possibility of a total electrical power failure with catastrophic consequences. A medium risk flight requires OC-ALC/CC approval of the Technical Test Plan (Tab 1) and Flight Test Cards (Tab 2).

2. BACKGROUND. B-1B aircraft 85-0085 arrived 29 Jul 96 for PDM. Aircraft experienced intermittent electrical failures during Functional Check Flight (FCF) on 27 Nov 96. Troubleshoot defect and conducted Operational Check Flight (OCF) on 7 Dec 96. Intermittent failure reoccurred during flight. Extensive troubleshooting identified several defective electrical power components which feasibly could have caused the in-flight failure. These components were removed and replaced. Detailed troubleshooting background is included in Section II of the Technical Test Plan (Tab 1). An OCF is scheduled for 10 Jan 97, weather permitting, with FCF to follow 11 Jan 97. After successful FCF, delivery is scheduled for 22 Jan 97.

3. RECOMMENDATION. Sign Technical Test Plan at Tab 1 and Flight Test Cards at Tab 2.

[Signature]
Carl W. Conner, Col, USAF
B-1B System Support Manager

2 Tabs

1. Technical Test Plan, 9 Jan 97
2. Flight Test Cards, Project # 96-2113

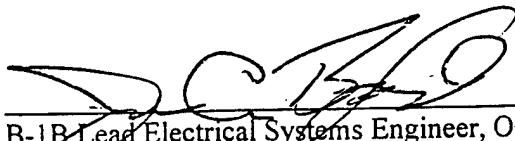
TABLE OF CONTENTS

- I. APPROVAL COORDINATION PAGE
- II. BACKGROUND
- III. TEST OBJECTIVE
- IV. INSTRUMENTATION
- V. POST-REPAIR CHECKOUT AND INSPECTION / PRE-FLIGHT
- VI. FLIGHT PROCEDURES
- VII. RISK ASSESSMENT
- VIII. TRB/SRB MEETING MINUTES

- ATTACHMENTS:
- 1. Post Flight 1 troubleshooting procedures
 - 2. Post Flight 2 troubleshooting procedures
 - 3. Over-the-shoulder video T-2 Package
 - 4. EMUX Bus Analyzer(EBA) T-2 Package
 - 5. POC listing

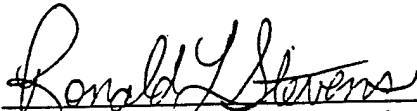
I. APPROVAL COORDINATION PAGE

Written by:


B-1B Lead Electrical Systems Engineer, OC-ALC/LABEA

9 JAN 97
Date

Reviewed by:


Chief, B-1B Engineering Branch, OC-ALC/LABE

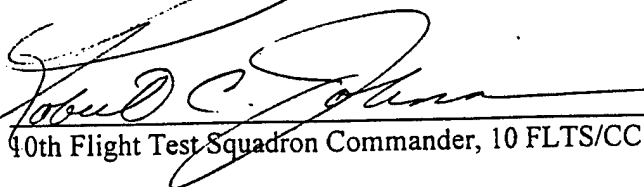
9 Jan 97
Date

Approved by:


B-1B System Support Manager, OC-ALC/LAB

9 Jan 97
Date

Approved by:


10th Flight Test Squadron Commander, 10 FLTS/CC

9 Jan 97
Date

Approved by:


OC-ALC TESTREP

9 JAN 97
Date

Approved by:


TRB Chairperson

9 Jan 97
Date

Approved by:


SRB Chairperson

9 JAN 97
Date

Approved by:


OC-ALC/CC

10 Jan 97
Date

II. BACKGROUND

- a. B-1B 85-0085 experienced six intermittent power failures lasting approximately one to four seconds each during its first Functional Check Flight (FCF) on 27 Nov 96. Upon experiencing the failure, the flight crew declared an in-flight emergency and returned to base immediately. The crew described the symptoms of the failure as an apparent loss of power to a large portion of the crew compartment. The occurrences of the failure were random, and after each failure the aircraft restored itself.
- b. Once the aircraft was made safe for maintenance, the ground crew ran the engines in an attempt to duplicate the failure on the ground. No anomalies were noted during more than five hours of engine runs. At this point, LABE engineering was contacted to provide troubleshooting assistance. LABE provided a troubleshooting test log which the ground crew began accomplishing with engineering support. All wiring and components in the electrical generation system were inspected for evidence of poor connections and/or damage. No significant defects were found. All available flight data was also analyzed for any evidence of system malfunction. Flight data showed an intermittently low frequency output from Constant Speed Drive (CSD) #2. As a result, the CSD Control Unit (CSDCU) #2 was removed and replaced. During accomplishment of an electrical power generation and distribution ground readiness test (GRT), Generator Control Unit (GCU) #2 was found to be defective. The defective component was also removed and replaced. Once GCU #2 was replaced, another electrical power generation and distribution GRT was accomplished, with no defects found. Since no available data existed suggesting any other defective components or systems on the aircraft and all relevant operational checks were successfully accomplished, the maintenance and engineering community agreed to recommend a reflight.
- c. A meeting to discuss the reflight of 85-0085 was held on 5 Dec 96 with key players from LAP, LAB, 10 FLTS, and Boeing in attendance. Troubleshooting activities and flight procedures were presented and discussed, and the outcome of the meeting was approval to accomplish an Operational Check Flight (OCF) on 7 Dec 97.
- d. Aircraft 85-0085 was flown on 7 Dec 96 and the flight crew experienced the power failure 48 minutes into the 52 minute flight. Continued troubleshooting began immediately with LAB engineering developing another test log for the ground crew to accomplish. Extensive wiring checkout was accomplished, with efforts concentrated on wiring modified during PDM and high voltage draw circuits. No significant defects were found. The entire electrical multiplexing (EMUX) bus, both the physical components of the bus and the data flowing on the bus, was inspected and no defects were found. An EMUX Bus Analyzer was connected to the aircraft in an attempt to collect additional data while performing engine runs and operating several systems on the aircraft. All collected data was analyzed with no anomalies found. All electrical contactors on the aircraft were tested and three contactors (Load Contactor #1, Load Contactor #3, and Bus Tie Contactor #2) were found to have high resistance on internal contacts. Each defective contactor was removed and replaced. All three Integrated Drive

Generators (IDG) were removed from the aircraft and sent to the back shop for testing. IDG #2 showed an out of tolerance frequency anomaly and IDG #4 experienced total intermittent failure on the test bench. Both IDG #2 and IDG #4 were removed and replaced. Approximately 400 operational checks were accomplished to verify continuity of disturbed systems and to verify correct system operation. Several minor defects were found during the checks and have been troubleshot and corrected.

e. The conclusion drawn from the troubleshooting activities is: While impossible to guarantee, the engineering community believes the failure of IDG #2 and IDG #4 feasibly could have, and did, cause the failure experienced by the flight crew. Had the IDGs failed for a longer period of time, the aircraft's circuit protection system would have been activated and the faulty generator, or generators, would have been isolated from the rest of the aircraft.

III. TEST OBJECTIVE

a. The main objective of this test is to verify that the maintenance actions performed since the second flight of 85-0085 have corrected the problems that have caused the electrical system failures described above. A second objective is to collect data through the use of aircraft instrumentation which will either verify that the problems have been corrected, or will provide useful data for further troubleshooting should the failure occur again.

IV. INSTRUMENTATION

a. Instrumentation for this flight will include an over-the-shoulder video camera system and also the EMUX Bus Analyzer (EBA). Installation of the over-the-shoulder video camera system will be performed by the 49th Test Squadron from Barksdale AFB, LA. Installation and operating procedures will be performed per approved T-2 package titled, "Installation of 8mm Camcorder System on B-1B A/C for F.O.T & E", dated 21 Jan 93 and reestablished and approved on 18 Dec 96 (T-2 mod #OC-LAB93-014, W 3001). This T-2 package is included in this test plan as Attachment 3.

b. The video camera will be used to observe cockpit panels TBD.

c. Installation and operation of the EBA will be performed per T-2 package titled, "EMUX System In-Flight Monitoring" dated 6 Nov 95 and reestablished and approved on 18 Dec 96 (T-2 mod # OC-LAB95-010 R1). This T-2 package is included in this test plan as Attachment 4.

d. Operation of EBA in Flight: The following procedure will be used to operate the EBA in flight:

1. Turn the EBA on by depressing the ON/OFF button which is located on the left hand side of the touch screen to ON. (note: The button directly below the ON button is to control screen brightness.)
2. Once the boot up procedure and self test has been completed, select the REC menu

by tapping the REC button twice very quickly. (note: This will change the color of the button and within 20 seconds, the TEAC will show running.

e. Operation of Over-the-Shoulder Camera in Flight: The operation of the cameras requires nothing more than pushing the REC and PLAY buttons on the VCR(one per camera) to begin recording.

V. POST-REPAIR CHECK-OUT AND INSPECTION/PREFLIGHT

a. Prior to flying aircraft 85-0085 with the EMUX Bus Analyzer and the Over-the-Shoulder Cameras installed, an Electrical Magnetic Interference Check (EMIC) must be performed. The purpose of this test is to ensure that the instrumentation recording system installed on the aircraft does not interfere with aircraft electrical systems.

b. The following procedure will be completed and signed off prior to flight:

1. With the EBA and cameras installed and turned OFF, Aircrew members will perform pre-flight checks up to TAXI. The aircraft will be configured back to APUs with number 2 and 4 generators on line (LM2).

2. Turn the EBA and cameras on and start the recorder. Reaccomplish the pre-flight check up to TAXI. If the aircraft systems operate properly, then the aircraft is ready to fly.

c. Prior to flight, verify that each camera has been adjusted to properly record the correct location and is in focus. This will be done using the Sony Watchman miniature TV which will be provided by the 49th Test Squadron as part of the Over-the-Shoulder package.

VI. FLIGHT PROCEDURES

a. A 10 FLTS B-1B crew will fly aircraft 85-0085 from Tinker AFB, OK on or about 10 Jan 97. All procedures outlined in this test plan are within the scope of normal or functional check flight tech order procedures.

b. Flight Restrictions: All flight activity on this flight will be conducted using a conservative approach. Weather minimums will be at least 5000 ft ceiling and 5 SM visibility. All flight operations will be conducted clear of clouds. The aircraft gross weight will be limited to 260,000 pounds maximum (approximately 75,000 pounds fuel) in order to allow for immediate landing should it be necessary. Runway conditions must be dry(RCR 26). In addition, wing sweep will be limited to a maximum of 25o in order to ensure a landable configuration in the event of an emergency. This flight will be conducted in the local area within 40 NM of Tinker AFB. If any electrical system anomalies occur, the flight crew will record as much data as possible and return to base immediately.

c. Preflight: Preflight will be performed in accordance with normal T.O. procedures and will also include the procedures described in section V.

d. Takeoff: Performed using normal takeoff procedure at 15 degree wing sweep. Flaps will be retracted to 1/2 on departure. However, gear, slat, and full flap retraction will be delayed for five minutes as a safety precaution. This will also allow them to be retracted on^e at a time in order to isolate aircraft system operations to the maximum extent possible.

e. Climb/Level Off: Perform a tech order climb to an altitude between 10,000 ft MSL to FL200.

f. In-Flight Maneuvering: After retracting the gear, flaps, and slats, fly for 15 minutes each at 15, 20, and 25 degrees wing sweep. Twenty-five degree wing sweep will not be selected until 45 minutes after takeoff. At each of these wing sweep settings, perform the following maneuvers:

1. Push-over-pull-up (POPU) maneuvers from -0.5g to +1.5g
2. Steep turns at 45-50 degrees of bank (2g maximum)
3. Pitch, roll, and yaw doublets IAW T.O. 1B-1B-6CF-1

g. Cruise: Fly at 25 degree wing sweep in the altitude block from 10,000 ft MSL to FL200 for an additional hour. The following system checks will be performed during this time period in the following order:

1. TER FLW in-flight check
2. Hi-Res Offensive Radar System (ORS) operation
3. Real Beam Ground Map operation in the continuous sweep mode (will be left on for remainder of the sortie)
4. Operation of other aircraft electrical components (comm systems, nav systems, autopilot, anti-ice, afterburner, etc)

h. Electrical System Checkout: After a minimum of one hour and a half of uneventful flight time, the following electrical system checkout will be performed:

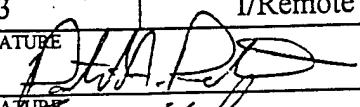
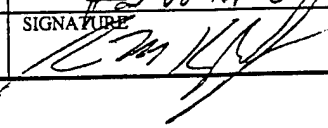
1. Record volts/freqs readings for all electrical buses and generators
2. Place Gen 1 switch to OFF while monitoring electrical buses
3. Record volts/freqs readings for all electrical buses and generators
4. Place Gen 1 switch to RESET/ON
5. Record volts/freqs readings for all electrical buses and generators
6. Repeat a-e for Generators 2 and 4

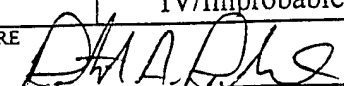
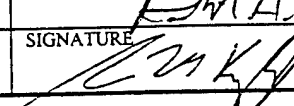
This basic procedure is used when performing a functional check flight as part of the engine shut down/restart test. However, no engines will be shut down during this sortie except if required for an aircraft emergency.

i. Pattern Operations: After the electrical system checkout, the aircraft will return to base and perform an instrument approach and landing pattern in accordance with normal T.O. procedures. A touch-n-go landing will be performed followed by a visual full stop landing.

VII. RISK ASSESSMENT

- a. Based on the following six Test Hazard Analysis Sheets, this flight has been agreed to by the TRB and SRB Chairmen to be a MEDIUM RISK FLIGHT. The approval authority for this flight is OC-ALC/CC.
- b. The basis for the medium risk determination was that the possibility of total loss of electrical power is very slightly higher on this flight than on a usual B-1B sortie, due to the nature of the in-flight failure.

TEST HAZARD ANALYSIS (THA)		PAGE 1 OF 6 PAGES
TEST SERIES Intermittent Power Failure Anomaly Flight For Aircraft 85-0085, Project #96-2113		HAZARD CAT/PROBABILITY I/Remote
PREPARED BY (NAME AND TITLE) Capt. Patrick A. Penland	SIGNATURE 	
UNIT TEST SAFETY OFFICER (TYPE NAME AND GRADE) Maj. Sam M. Kyle	SIGNATURE 	
<p><u>Hazard</u></p> <p>-Loss of throttle control</p> <p><u>Cause</u></p> <p>-Complete loss of electrical power or total failure of AC electrical system without recovery</p> <p><u>Effect</u></p> <p>-Aircrew ejection and loss of aircraft</p> <p><u>Controls/Minimizing Procedures</u></p> <ul style="list-style-type: none"> -Ground tests related to electrical system troubleshooting completed, many repeated more than once -Restrict flight to local area only, within 40 NM of Tinker AFB -Restrict aircraft take-off gross weight to 260,000 lb. -Limit wing sweep to no more than 25° -Use weather minimums of 5000' ceiling and 5 NM visibility, remain clear of clouds for test flight -Conduct sortie only if Tinker AFB runway is reported dry -Thorough review and discussion of electrical system operation by aircrew <p><u>Corrective Actions/Emergency Procedures</u></p> <ul style="list-style-type: none"> -Follow appropriate procedures in T.O. 1B-1B-1-1 -AC POWER FAILURE (EMERGENCY GENERATOR NOT OPERATING) checklist on pages 3-183 through 3-185 <p><u>Risk Level</u></p> <p>-Medium</p>		

TEST HAZARD ANALYSIS (THA)		PAGE 2 OF 6 PAGE
TEST SERIES B-1B #85-0085 Confidence Flight Test		HAZARD CAT/PROBABILITY IV/Improbable
PREPARED BY (NAME AND TITLE) Capt. Patrick A. Penland	SIGNATURE 	
UNIT TEST SAFETY OFFICER (TYPE NAME AND GRADE) Maj. Sam M. Kyle	SIGNATURE 	

Hazard

-Loss of Stall Inhibit System, loss of FCGMS normal operation, trapped fuel, loss of fuel dump, inoperative speed brakes

Cause

-Total EMUX failure

Effect

-Reduced flight envelope, slower fuel transfer rate, immediate reduced range, possible heavy gross weight landing, landing ground roll increases 1,200 to 1,500 feet

Controls/Minimizing Procedures

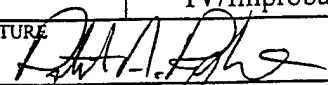
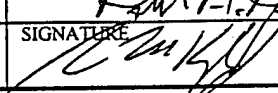
- EMUX Bus Analyzer (EBA) installed on aircraft, all known ground tests completed
- EMUX boxes removed and tested for malfunctions
- Restrict flight to local area only, within 40 NM of Tinker AFB
- Restrict aircraft take-off gross weight to 260,000 lb.
- Limit wing sweep to no more than 25°
- Use weather minimums of 5000' ceiling and 5 NM visibility, remain clear of clouds for test flight
- Conduct sortie only if Tinker AFB runway is reported dry
- Thorough review and discussion of electrical system operation by aircrew

Corrective Actions/Emergency Procedures

- Follow appropriate procedures in T.O. 1B-1B-1-1
- TOTAL EMUX FAILURE checklist on pages 3-177 through 3-178
- TOTAL EMUX FAILURE LANDING checklist on pages 3-211 through 3-213

Risk Level

-Low

TEST HAZARD ANALYSIS (THA)		PAGE 3 OF 6 PAGES
TEST SERIES B-1B #85-0085 Confidence Flight Test		HAZARD CAT/PROBABILITY IV/Improbable
PREPARED BY (NAME AND TITLE) Capt. Patrick A. Penland	SIGNATURE 	
UNIT TEST SAFETY OFFICER (TYPE NAME AND GRADE) Maj. Sam M. Kyle	SIGNATURE 	

Hazard

-Loss of EMUX bus redundancy

Cause

-Single EMUX bus failure

Effect

-Except for a momentary transient (lights may blink), normal system operation can be expected

Controls/Minimizing Procedures

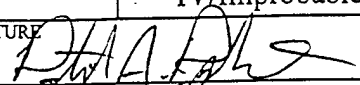
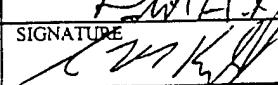
- EMUX Bus Analyzer (EBA) installed on aircraft, all known ground tests completed
- EMUX boxes removed and tested for malfunctions
- Restrict flight to local area only, within 40 NM of Tinker AFB
- Thorough review and discussion of EMUX operation by aircrew

Corrective Actions/Emergency Procedures

- Follow appropriate procedures in T.O. 1B-1B-1-1 to confirm EMUX failure using CITS
- SINGLE EMUX BUS FAILURE checklist on page 3-175

Risk Level

-Low

TEST HAZARD ANALYSIS (THA)		PAGE 4 OF 6 PAGES
TEST SERIES B-1B #85-0085 Confidence Flight Test		HAZARD CAT/PROBABILITY IV/Improbable
PREPARED BY (NAME AND TITLE) Capt. Patrick A. Penland	SIGNATURE 	
UNIT TEST SAFETY OFFICER (TYPE NAME AND GRADE) Maj. Sam M. Kyle	SIGNATURE 	

Hazard

-Loss of a single EMUX box

Cause

-Single EMUX control box failure

Effect

-Zeroing of the following indicators for 6 to 8 seconds at 65 second intervals: Fuel Quantity Vertical Tapes, %MAC indicator, L/R Tank Quantity Indicators, Gross Weight Indicator, and Total Fuel Quantity Indicator

Controls/Minimizing Procedures

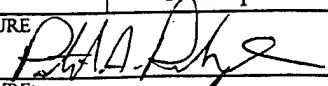
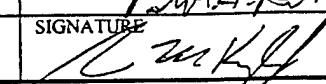
- EMUX Bus Analyzer (EBA) installed on aircraft, all known ground tests completed
- EMUX boxes removed and tested for malfunctions
- Restrict flight to local area only, within 40 NM of Tinker AFB
- Thorough review and discussion of EMUX operation by aircrew

Corrective Actions/Emergency Procedures

- Follow appropriate procedures in T.O. 1B-1B-1-1 to confirm EMUX failure using CITS and interrupt failed EMUX box
- SINGLE EMUX CONTROL BOX FAILURE checklist on page 3-175

Risk Level

-Low

TEST HAZARD ANALYSIS (THA)		PAGE 5 OF 6 PAGES
TEST SERIES B-1B #85-0085 Confidence Flight Test		HAZARD CAT/PROBABILITY IV/Improbable
PREPARED BY (NAME AND TITLE) Capt. Patrick A. Penland	SIGNATURE 	
UNIT TEST SAFETY OFFICER (TYPE NAME AND GRADE) Maj. Sam M. Kyle	SIGNATURE 	

Hazard

-Partial EMUX failure

Cause

-Degradation or failure of one or both EMUX busses or both EMUX control boxes are contending for bus control

Effect

-FCGMS may "lock up" and not be retrievable

Controls/Minimizing Procedures

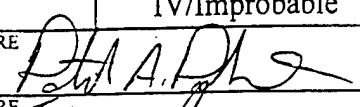
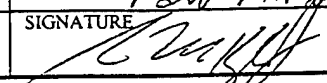
- EMUX Bus Analyzer (EBA) installed on aircraft, all known ground tests completed
- EMUX boxes removed and tested for malfunctions
- Restrict flight to local area only, within 40 NM of Tinker AFB
- Thorough review and discussion of EMUX operation by aircrew

Corrective Actions/Emergency Procedures

-Follow PARTIAL EMUX FAILURE checklist in T.O. 1B-1B-1-1, pages 3-176 through 3-176A

Risk Level

-Low

TEST HAZARD ANALYSIS (THA)		PAGE 6 OF 6 PAGES
TEST SERIES B-1B #85-0085 Confidence Flight Test		HAZARD CAT/PROBABILITY IV/Improbable
PREPARED BY (NAME AND TITLE) Capt. Patrick A. Penland	SIGNATURE 	
UNIT TEST SAFETY OFFICER (TYPE NAME AND GRADE) Maj. Sam M. Kyle	SIGNATURE 	

Hazard

-EMUX system cycling

Cause

-Both EMUX control boxes are in contention for bus control

Effect

-If cycling fails to stop, consider it a total EMUX failure

Controls/Minimizing Procedures

- EMUX Bus Analyzer (EBA) installed on aircraft, all known ground tests completed
- EMUX boxes removed and tested for malfunctions
- Restrict flight to local area only, within 40 NM of Tinker AFB
- Thorough review and discussion of EMUX operation by aircrew

Corrective Actions/Emergency Procedures

-Follow EMUX SYSTEM CYCLING (CONTROL BOX CONTENTION) checklist in T.O. 1B-1B-1-1, pages 3-178 through 3-179

Risk Level

-Low

VIII. Technical Review Board (TRB)/Safety Review Board (SRB) Minutes

DATE: 8 Jan 97

PURPOSE: To review the Intermittent Power Failure Test Plan and the associated risk level for conducting a test flight on B-1B 85-0085.

1. 1Lt Jon Bradford, OC-ALC/LABE welcomed the attendees. He noted that the appropriate representatives for conducting a successful TRB/SRB were present. A complete list of attendees and their organizations is provided as a part of these minutes. Lt Bradford presented a patient history on a/c 85-0085 to include all troubleshooting and maintenance actions taken on the aircraft since the electrical problem was first experienced in the Periodic, Depot Maintenance (PDM) Functional Check Flight (FCF).
2. Lt Bradford presented six Test Hazard Analyses (THSs) from most critical to least critical. LABE assigned a low risk level to all six. There was disagreement from the 10FLTS and the OC-ALC TESTREP on the low risk level LABE assigned to the Loss of Throttle Control Hazard. After some discussion of the definitions of low and medium risk, the TRB/SRB membership determined that a medium risk was appropriate for this hazard. There was agreement on the remaining five.
3. Due to the risk level change on the Loss of Throttle Control Hazard, the overall test was declared a medium risk test. As a result, OC-ALC/CC approval is required before proceeding into flight test. LAB/LAP are preparing a staff summary sheet with the Test Plan and 10FLTS test cards as attachments.
4. Maj Kyle from the 10FLTS raised a concern about the lack of detail of the go/no-go criteria in the Test Plan. He suggested that the following be added as a minimum:
 1. There are no red Xs in the AFTO Form 781 (e.g. no electrical anomalies found during preflight)
 2. The EMUX Bus Analyzer is installed and operational
 3. Day/Visual Flight Rules/Dry Runway
 4. EMIC Test successfully completed
 5. Weather minimums met
5. At the conclusion of Lt Bradford's presentation, he reminded the TRB/SRB membership that the engineering community is very confident that the maintenance actions taken on B-1B 85-0085 have fixed the anomalies experienced by the 10FLTS flight crew, however due to the nature of the problem this is impossible to guarantee.
6. There were no formal action items assigned.

7. Pending the risk level change and the expanded go/no-go criteria, the TRB/SRB membership recommended the package be submitted to OC-ALC/CC for approval.

TRB/SRB Attendance List

NAME	ORGANIZATION	BASE EXTENSION
Greg Gilbert	OC-ALC/LABEF	67726
Suresh Chandra	OC-ALC/LABEA	65646
LtCol David Crouser	OC-ALC/TIE	63528
Ronald Larrison	OC-ALC/LHPSB	63904
Capt J.D. Scarborough	OC-ALC/SEF	93511
Allan Jackman	OC-ALC/SEF	93511
Maj Sam Kyle	10FLTS/DO	67719
Capt Patrick Penland	10FLTS/ADO	67719
LtCol Bob Johnson	10FLTS/DFO	67719
Mike Vesta	OC-ALC/LAPPB	62917
Carolyn Hines	OC-ALC/LARM	62551
Royce Girod	OC-ALC/SES	93511
Maj John Cerra	OC-ALC/TIE (TESTREP)	65498
LtCol Keith Beachy	OC-ALC/SE	93511
Ron Stevens	OC-ALC/LABE	63704
LtCol Kenny Wilkerson	10FLTS	67719
Capt Renee Little	OC-ALC/LAB-1	62747
Capt Phil Kirker	OC-ALC/LABE-1	63221
Maj Bernie Lemay	OC-ALC/10FLTS	67719
David Bartemy	OC-ALC/LAPEA	67146
David Thompson	OC-ALC/LAPPBD	63498
Sharon Rollin	OC-ALC/LAPSBB	62351
Kay Monroe	OC-ALC/LABP (PAO)	62912
Richard Reed	OC-ALC/LABP (PAO)	62912
Cindy Markgraf	OC-ALC/LABEF	63315
Don Gormley	OC-ALC/LAPPBD	62920
Bill Herold	BNA SES	62933
Charlie Blaine	OC-ALC/LAPEA	62914
C.Y. Asada	BNA SES	62816

ATTACHMENT 1:

**POST FLIGHT 1 TROUBLESHOOTING
PROCEDURES**

Troubleshooting Activities

After Original FCF

- 1) Task: Ran engines on ground to attempt to duplicate the failure.
Result: Could not duplicate in 5 hours of engine runs. EMUX responded properly to induced faults (EMUX Integrity Checks). Heavily loaded the generators with aircraft systems (i.e. radar, blowers, etc.) and the aircraft operated properly.
- 2) Task: Verified engine vane heater plugs were properly disconnected and stowed.
Result: Checked good.
- 3) Task: Checked for evidence of wire chafing by visually inspecting area around 932 production break (1062 Mod).
Result: No evidence of chafing.
- 4) Task: Inspected all wiring in the #2 system from the Generator to the Generator Line Contactor (CSD, CSDCU, GCU). Visually inspected wiring and connectors and moved wiring while Generators were operating.
Result: All checked good.
- 5) Task: Check #2 GLC for high resistance.
Result: Checked good.
- 6) Task: Test #2 GCU using CEMU GCU checkout.
Result: #2 GCU Failed. Switched #1 and #2 GCU and failure appeared in #1 system. Replaced #2 GCU with good unit; aircraft checked good.
- 7) Task: Replace #2 CSDCU due to low frequency evident at #2 Generator (discovered by examining CITS flight data).
Result: Good #2 CSDCU.
- 8) Task: Run Electrical Power Generator Distribution GRT.
Result: Verified #2 CSDCU giving in tolerance frequency output. Verified proper system response to faults (i.e. Emergency Generator came on immediately after power failure).
- 9) Task: Work other in flight defects.
Result: All other defects signed off.

- 10) Task: Boeing SES and LAP Avionics analyzed CITS data of any suspected aircraft systems that could initiate this airborne problem.
Result: Could not find anything significant.

After Briefing With OC-ALC/LAP and 10 FLTS (Flight Test Crew)

Accomplished Step 4 above to include generator systems #1 and #4. Repeated Steps 5, 6, and 8. All checked good.

During Unrelated Flight Defect Troubleshooting of Left Cooling Loop Pump (CMC 280F3) - 7 Connectors Demated on PCA2455A06. Ops Checked Disturbed Systems with Test Procedure Shown Below (202 Attached) Ref T.O. 1B-1B-2-24GS-00-1. Test Results Shown By Task. Test Procedure Results - all disturbed systems checked good; found 1 bad position light which was replaced.

Test Procedure

I. Prior to Eng Conf Run

EMUX GRT - Checked Good.

Eng. Bleed Air Leak Detect 21-15-01- Checked Good.

Prox. GRT 40GRT-39-05. CMC 3903B (Intmd Wpn - Prox Sw).

Airborne Checks- All Checked Good.

Right Cooling Loop Bypass Airborne PMC 310302028 = ON
Ground PMC 310116081 = ON

Left Cooling Loop Return Airborne PMC 311002028 = ON
Ground PMC 311102028 = ON

Right Cooling Loop Return Airborne PMC 310802028 = ON
Ground PMC 310902028 = ON

Fuel Cooling Scoop Switch To Auto/Close

Left	Closed	PMC 311302073
	16 deg	PMC 311402073
	32 deg	PMC 311502073
Right	Closed	PMC 310702036
	16 deg	PMC 311202052
	32 deg	PMC 311302052

Moveable Lips (Eng 1 & 3) - Drive Open 10 deg and Close

Ground - 40 degrees, gear handle up = 10 degrees, CADC High Test = Closed
with handle up- Checked Good.

Yaw Limiter - Per CEMU Paragraph- Checked Good.

II. Perform Eng. Conf. Run - Ensure all listed tasks are accomplished - List CMCs. All tasks checked good (did find 1 bad position light).

Perform Cross Ship Start

Alt Pitch Trim Test - Nose Up and Nose Down
Stby Pitch Trim Test - Nose Up and Nose Down
Pilot Stby Pitch Trim Test - Nose Up and Nose Down
Copilot Stby Pitch Trim Test - Nose Up and Nose Down

Operate Speed Brakes Up and Down

Normal Preflight Wing Sweep Check

Verify Hydro Pressure and Qty

Transfer Fuel In/Out Tank2, 3, Lt Wing, Rt Wing

Set Trans Pmp TK2 to ON	No CMC 280E2
Set Trans Pmp TK3 to ON	No CMC 280E4
Set Trans Pmp LWG to ON	No CMC 280EA
Set Trans PMP RWG to ON	No CMC 280EC

Set Blst Tnk Isln V11 Switch to Open	No CMC 28150
--------------------------------------	--------------

Set Xfeed Switch To Open	No CMC 28152
--------------------------	--------------

Set Antiskid Switch To Open	No CMC 320CE
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Set 3342S2 to STBY, 3344S1 to DIM. Verify tail position and anti-coll (L & R) ON

Set 3342S2 to STBY, 3344S1 to BRT. Verify tail position and anti-coll (L & R) ON

Verify L & R Aft Attitude Indicator Are Both ON

Boeing SES Performed several CEMU Checks. All checked good.

ATTACHMENT 2:

**POST FLIGHT 2 TROUBLESHOOTING
PROCEDURES**

TROUBLESHOOTING

After OCF Local

Ran Electrical Power Generator Distribution GRT - Four CMCs Output

24909 - LC # 2 Coil Tripped

24914 - GCU # 2 Open Phase

24919 - GCU # 2 Overfrequency

249EF - Emergency Generator Solenoid Failed Open

R&R GCU # 2 and CSDCU # 2 to rectify all 4 CMCs. (Note: This is the second time these components have been changed since the initial failure.)

Performed checks on connectors affected by the AFT DC Modification.

Had to remove DAU # 3, GCU # 1, TCU # 1, TCU # 2, an EMUX DD Box, SIP, another GCU, and TCU # 3 or # 4 to access the connectors listed above. All disturbed systems were operationally checked upon replacing them in the aircraft. All ops checks were good.

Checked Fuel Relay Panel and the new Circuit Breaker Box installed during AFT DC. Checked good.

Checked wires and contacts on 3945J86 and 3946J86, checked good.

Performed continuity checks for connectors on Gen # 1, Gen # 2, GCU # 1, and GCU # 2. All checked good.

Visually inspected for chafing/damage all power wires not protected by current transformers. Also shot pin-to-ground and pin-to-pin. Found no faults.

Ongoing telecons from Boeing SES to: Seal Beach design engineers, Palmdale engineers, Edwards AFB engineers, Ellsworth personnel and CETS Warner-Robbins conducted problem interface discussions.

Ran Electrical Power Generator Distribution GRT - No CMCs found.

Boeing SES, LAP Avionics and LAS personnel in the software lab (analyzers and programmers) could not find any problems by analyzing CEPS data of the flight.

The entire electrical multiplexing (EMUX) system was inspected and no defects were found.

Connected an EMUX Bus Analyzer to the aircraft to attempt to collect additional data while performing engine runs and operating several systems on the aircraft. All collected data was analyzed with no anomalies found.

Tested all electrical contactors on the aircraft. Three contactors, Load Contactor #1, Load Contactor #3, and Bus Tie Contactor #2, were found to have high resistance on internal contacts. Each defective contactor was removed and replaced.

Removed all three Integrated Drive Generators (IDG) and sent to back shop for testing. IDG #2 showed an out of tolerance frequency anomaly and IDG #4 experienced total intermittent failure on the test bench. Both IDG #2 and IDG #4 were removed and replaced

Accomplished approximately 400 operational checks to verify continuity of disturbed systems and to verify correct system operation. Several minor defects were found during the checks and have been troubleshot and corrected.

ATTACHMENT 3.

T-2 MOD PACKAGE FOR OVER-THE-SHOULDER VIDEO



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS OKLAHOMA CITY AIR LOGISTICS CENTER (AFMC)
TINKER AIR FORCE BASE, OKLAHOMA

18 DEC 1996

MEMORANDUM FOR OC-ALC/LAPP
ATTN: MR. MIKE VESTA
2122 PERIMETER ROAD, STE F-44
TINKER AFB, OK 73145-3025

FROM: OC-ALC/LABE
3001 Staff Drive, Ste 2AA81A
Tinker AFB OK 73145-3006


SUBJECT: T-2 mod, OC-LAB93-014, W 3001, 8mm Camcorder System

1. The B-1B SSM has reviewed and re-approved the subject T-2 modification. Engineering approval and safety of flight certification is hereby given by the B-1 SSM.
2. Prior to accomplishing this mod please provide tail numbers for the affected aircraft. A maximum of five aircraft may be modified with this T-2 modification. Approval of this temporary modification is good for a period of one year. If further use is necessary please provide a request for extension to this office.
3. Engineering point of contact for this T-2 mod is Lt. J.C. Bradford, LABEA, DSN: 336-4431. Configuration point of contact is Tom Fedor, LABEC, DSN: 336-3058.

ZANE R. BOATRIGHT, Acting Chief
Engineering Branch
B-1B System Support Mgt Div

MODIFICATION PROPOSAL				DATE 21 Jan 93		PAGE 1 OF PAGES	
THRU: 79TFG/LGMA Eglin AFB FL 32542		TO: HQ ACC/LGMA/STC 210 130 Douglas St. Langley AFB VA 23665-2791		FROM: (Organization, location, address and ZIP Code) 49TESTS/LGW 965 Twining Dr Ste 102 Barksdale AFB LA 71110-2415			
1. TITLE Installation of 8mm Camcorder System on B-1B Aircraft for Follow-on Operational Test and Evaluation (FOT&E)							
2. PROPOSED CLASS				3. TYPE PROPOSAL			
T-1		T-2		PERMANENT(P)		P-SAFETY	
		X				X	
NEW PROPOSAL				COMMAND CERTIFICATION			
4. UNIT CONTROL NO. 49TSB1B008		5. MAJCOM/STC CONTROL NO.		6. TCTO NO.		7. MIP NO.	
8. EOP NO.		9. MOD NO. W3001		10. MANUFACTURER		11. OTHER IDENTIFIER/ SUGGESTION NO.	
12. AFFECTED CONFIGURATION ITEM				13. ALSO AFFECTS			
MOD/TMS B001B				YES NO			
NOUN Strategic Bomber				SUPPORT EQUIPMENT YES NO X			
NSN NA				AIRCREW TRAINING DEVICES YES NO X			
WUC NA				SOFTWARE YES NO X			
SRD CODE ABA/AB9				MAINTENANCE TRAINING DEVICES/VISUAL AIDS YES NO X			
OTHER				OTHER YES NO X			
14. ACTION OFFICER (Name, grade, military address and DSN number)							
ORIGINATING UNIT 49TESTS/LGW Barksdale AFB LA 71110-2415 SSgt Friedman DSN 781-3773		MAJCOM HQ ACC/LGMA Langley AFB VA 23665-5541		ALC OC-ALC/LSERA Tinker AFB OK 73145-5580 Terry Larkins, DON 936 7442		33(74)2	
15. PURPOSE (State the need or deficiency to be corrected and include expected results.) The 49th Test Squadron is tasked with B-1B FOT&E Offensive Testing. FOT&E mission information is collected through the use of a Video Camera Recorder System (MOD# A90-0040) which records multifunction displays (MFD), and the Production Data Acquisition System (PDAS) (MOD# 091-0103) which records Military Standard 1553 bus data. The video system currently receives its power from the PDAS. The PDAS will shortly be replaced with the Airborne Instrumentation Test Recorder (ABITR) system (MOD# 020916) which does not have the capability to power the video system. With the replacement of the PDAS, the 49th will lose both the video time/date insertion device and the video power source. A replacement time/date insertion device and alternate power source are imperative to continue recording time correlated video information for these missions.							
16. IMPACT (Urgency of need and impact if not satisfied.) The loss of time correlated information collected from the video system will severely hamper flight test anomaly investigations. Approval is needed to collect accurate and usable data from FOT&E and other higher headquarters directed tests.							
17. PROPOSED SOLUTION Install an 8mm Video Camcorder system to replace the existing camera system. The 8mm camcorder has a built-in time/date insertion device which will provide accurate time and date to be imprinted on the tape. The power to operate this system would be supplied by the sustenance storage area on the aircraft (115vac).							

18. MODIFICATION DATA									
A. KIT/UNIT COST		B. TOTAL COST		C. UNIT WORK HOURS		D. TOTAL WORK HOURS			
		MAJCOM USAF		1.0		MAJCOM USAF			
E. NO. OF C/S AFFECTED		F. LEAD TIME		G. TOTAL UNITS/KITS FOR		H. TOTAL USAF INVENTORY			
MAJCOM USAF				MAJCOM USAF					
19. LEVEL OF ACCOMPLISHMENT									
PRODUCTION		ON MAINTENANCE		DEPOT		CONTRACTOR		X OTHER TEST	
20. REMARKS (If more space is needed, continue on plain paper and identify by item No.)									
<p>The sustenance storage area on the aircraft contains a 3 pin female plug which normally provides power to the hot jug. Pin 2 supplies 115 vac through a 2 amp circuit breaker, and pin 1 is the return. The 49th procured a hot jug with a defective heating element. The heating element has been removed and the hot jug modified to meet our requirements. The modification entailed wiring the male plug of the hot jug (pins 1 and 2) to an outlet box mounted inside the hot jug. The 8mm video system AC adapter will be plugged into this outlet. The AC adapter will drop the voltage down to useable voltage for the 8mm video camera. The 8mm video camera will be mounted on a small adapter attached to the camera mount already approved by MDD# A90-0010. During this modification, the aircraft will use the sustenance storage containers. The aircraft will be returned to original configuration upon completion of testing. See attachments for further details. Modified hot jug will be painted orange. Pin 3 will be removed from modified hot jug power receptacle.</p>									
21. UNIT APPROVAL									
DATE		TYPE NAME, GRADE, TITLE AND DSN NUMBER				SIGNATURE			
22 Jan 93		DAVID F. MACYNSKI, Major, USAF Chief, Test Management Branch				<i>David F. Macynski</i>			
22. CCB ACTION HISTORY/MAJCOM REMARKS									
AIG approval letter received 20 July 1993.									
23. MAJCOM CCB ACTION									
24. MAJCOM CCB COORDINATION/CERTIFICATION									
DATE	OFFICE SYMBOL	NAME AND GRADE	DATE	OFFICE SYMBOL	NAME AND GRADE	DATE	OFFICE SYMBOL	NAME AND GRADE	
22 Jan 93	79TEG/MCH	David F. Macynski, LT COL							
22 Jan 93	79TEG/LGX	David A. Macynski, MSgt							
22 Jan 93	USAFWC/SE	MSgt							
22 Jan 93	USAFWC/TCM	Clayton A. Macynski, MSgt							
25. MAJCOM APPROVAL AUTHORITY									
DATE		CCB CHAIRPERSON (Type name, grade, etc symbol and DSN number)				SIGNATURE			
22 Jan 93		STEPHEN W. BOUDREAU, LTC, USAF				<i>Stephen W. Boudreau</i>			

25.		USJCOM APPROVAL AUTHORITY	
DATE	CCB CHAIRPERSON (Type name, grade, dlc symbol and OSH)	SIGNATURE	
15 JUL 80	STEPHEN W. BOURDEAUX, 1E COL, USAF		

MODIFICATION PROPOSAL				DATE 11/05/93		PAGE 1 OF 1 PAGES									
THRU: 79 TEG/LGXA Eglin AFB FL 32542		TO: HQ ACC/LGMA/STE 210 130 Douglas St. Langley AFB VA 23655-2791		FROM: (Organization, location, address, and ZIP code) 49TESTS/LGW 965 Twining Dr. Ste 102 Barksdale AFB LA 71110-2415											
1. TITLE B-1B Video Camera Mount Modification															
2. PROPOSED CLASS				3. TYPE PROPOSAL											
T-1	T-2	PERMANENT(P)	P-SAFETY	X	NEW PROPOSAL		COMMAND CERTIFICATION								
	X														
4. UNIT CONTROL NO. 49TSB1B003		5. MAJCOM/TAF CONTROL NO.		6. TC TO NO.		7. MIP NO.									
8. ECP NO.		9. MOD NO. W3036		10. MANUFACTURER		11. OTHER IDENTIFIER/ SUGGESTION NO.									
12. AFFECTED CONFIGURATION ITEM				13. ALSO AFFECTS											
MDS/TMS B001B				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">YES</td> <td style="text-align: center;">NO</td> <td style="text-align: center;">YES</td> <td style="text-align: center;">NO</td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> </table>				YES	NO	YES	NO		X		
YES	NO	YES	NO												
	X														
NOUN Bomber				SUPPORT EQUIPMENT											
NSN N/A				AIRCREW TRAINING											
WUC N/A				DEVICES											
SRD CODE ABA				MAINTENANCE TRAINING											
OTHER				DEVICES/VISUAL AIDS											
14. ACTION OFFICER (Name, grade, military address and DSN number)															
ORIGINATING UNIT SSgt William H. Friedman 49 TESTS/LGW/DSN 781-8773 Barksdale AFB LA 71110-2415		MAJCOM HQ ACC/LGMA Langley AFB VA 23655-5541		ALC Tony Larios, DSN 336-7442 OC-ALC/LAHRM Tinker AFB OK 73145-5580											
15. PURPOSE (State the need or deficiency to be corrected and include expected results.)															
<p>This modification proposal is the revalidation of the old Strategic Air Command modification (# A900040) to a new Air Combat Command modification number. This modification consolidates two previously approved AFOTEC B-1B Test Team Class II modification into one 513 TESTS Class II modification that provides a video recording capability for all four crew stations on the B-1B. The first AFOTEC Class II modification (M6B000A) authorizes the use of locally designed and fabricated camera mounts, cameras, and video recorders for the forward and aft crew stations. The second AFOTEC Class II modification (M810000A) authorizes the use of an alternate aft crew station camera mount. The 513 TESTS Class II modification (E900025) combines the two AFOTEC modifications for testing use.</p>															
16. IMPACT (Urgency of need and impact if not satisfied.)															
<p>The camera mounts and use of cameras and video recorders ensure a complete data collection capability. Approval for their use is needed for FOT&E and other higher headquarters directed tests.</p>															
17. PROPOSED SOLUTION															
<p>All of the camera mounts have been designed and fabricated by the AFOTEC B-1B Test Team. The mounts along with the video cameras and associated cabling were turned over to SAC and are currently being used. Request that approval allow either installation of all the cameras or a portion of the cameras as dictated by testing requirements.</p>															

MODIFICATION DATA

K. UNIT COST		B.	TOTAL COST		C.	UNIT WORK HOURS		D.		TOTAL WORK HOURS	
		MAJCOM	USAF		5 man hours				MAJCOM		USAF
E. NO. OF C/S AFFECTED		F. LEAD TIME		G. TOTAL UNITS/KNITS RQR		H. TOTAL USAF INVENTORY					
MAJCOM		USAF		MAJCOM		USAF					

19. LEVEL OF ACCOMPLISHMENT									
PRODUCTION		O/M MAINTENANCE		DEPOT		CONTRACTOR		X	OTHER

20. REMARKS (If more space is needed, continue on plain paper and identify by item NO.)

This is a temporary installation modification to support FOT&E requirements and higher headquarters directed tests. The aircraft will be returned to its original configuration upon completion of the tests. The camera mount for the forward crew station is installed immediately aft of the center, forward overhead panel. This location is well clear of the ejection seat envelope and poses no safety threat. The location of the aft station camera mounts are above the essential circuit breaker panels on the left and right sides of the DSU and OSU respectively. The alternate aft station camera mount is attached to the bottom of the Class II I-hand beacon mount. The four video recorders, one for each camera, and the single battery pack that operates all the units will be secured in the storage area under the OSO station's foot rest. Installation and removal of the equipment will be documented IAW T.O. 00-20-5. See Class II modification E900025 for complete details of the mounts, installation and removal procedures, safety analysis and human factors analysis.

21. UNIT APPROVAL		
DATE	TYPE NAME, GRADE, TITLE AND DSN NUMBER	SIGNATURE
5 November 1993	JAMES R. VILLINES, Lt Col, USAF Director of Operations	<i>James R. Villines</i>

22. CCB ACTION HISTORY/MAJCOM REMARKS	

23. MAJCOM CCB ACTION

24. MAJCOM CCB COORDINATION/CERTIFICATION					
DATE	OFFICE SYMBOL	NAME AND GRADE	DATE	OFFICE SYMBOL	NAME AND GRADE
4 Nov 93	25 TESTS/TAL	T.V. Saffern, Lt Col			
4 Nov 93	ARC/IL	LT COL			
4 Nov 93	47 TESTS/LEAD	W. J. Kennaugh, Lt Col			
4 Nov 93	25 TESTS/TAL	Robert P. Miller, MSgt			

25. MAJCOM APPROVAL AUTHORITY		
DATE	CCB CHAIRPERSON (Type name, grade, ofc symbol and DSN number)	SIGNATURE
8 Nov 93	MULRAIN, JOHN P GS-12 872-3847 25 TESTS/TAL ASST. FLT CHIEF	<i>John P. Mulrain</i>

INSTALLATION GUIDE FOR B-1B CONSTANT POWER CAMERA SYSTEM

The purpose of this guide is for the installation and removal of the Camera Systems on the B-1B aircraft. The components needed for this operation are:

- a. Forward Station Mounting Hardware PN- VID0001
- b. Aft Station Mounting Hardware PN- VID0002
- c. Aft Station Mounting Hardware Subassembly Mount
PN- VID0003
- d. Center Aisle Camera Mount-Aft PN- VID0004
(if applicable)
- e. Panasonic WV-CD22 Closed Circuit Camera (2 ea.)
- f. Panasonic WV-LA50B 50mm Lens (1 ea. for Forward Station)
- g. Panasonic WV-LA25B 25mm Lens (1 ea. for Aft Station)
- h. Panasonic WV-LA16B 16mm Lens (1 ea. optional)
- i. Panasonic AG-2400 Video Cassette Recorder (1 per camera)
- j. Panasonic VQL0949 Plug-In AC Adapter (1 per VCR)
- k. Sony Watchman Television FD-250
- l. Sony Watchman video cable
- m. Power and Video Cables (1 per camera/VCR)
- n. For.A VTG-22 Video Timer (1 per VCR)
- o. Video Recorder Tapes (min. 2 per VCR)
- p. Panasonic VSQ0251 VCR Remote Control
(optional one per VCR)
- q. VCR Cradle PN- VID0005

Associated support equipment:

- a. Wall Power Adapter for AC Adapter (1 per AC Adapter)
- b. Panasonic AP-212 12v VCR Batteries (Reserve power. 4
per VCR)

See last page of this document for Camera System shipping information.

TOOLS REQUIRED
(as required)

1. Small phillips screw driver
2. Small regular screw driver
3. Speed handle with Bit holder
4. #2 screw driver Bit
5. #2 Phillips screw driver
6. 3/8" x 7/16" wrench
7. 9/16" x 5/8" wrench
8. 7/16" socket (3/8" or 1/4" drive)
9. 1/2" socket (" " " ")
10. 3/8" or 1/4" drive ratchet
11. 3/4" wrench

*** NOTES ***

a. The VCR batteries are charged to full capacity before leaving the 49TESTS. However, before arriving at the aircraft ensure that the batteries to be used are fully charged by placing them back on charge using the AC Adapters. The batteries are fully charged when the red LED on the AC Adapter is extinguished.

b. If a Time Insertion Device is to be used, its battery MUST be charged for 48 hours prior to use. Therefore it is recommended that after the B-1B Camera System is installed and operationally checked good that the Time Insertion Device be removed and placed back on charge until 2 hours or less before flight.

c. It is recommended that after the B-1B Camera System has been installed and operationally checked good that the VCRs and all VCR batteries be removed and secured until 2 hours prior to flight. (SECURITY)

d. With the constant power modification, OAS power must be applied and MPDAS or PDAS turned on to power the camera system.

B-1B CAMERA INSTALLATION GUIDE

1. Locate the Forward Station Mounting Hardware. This will be the rectangle shaped bracket with two support arms protruding from the middle of the bracket. The support arms should be snug but not tightened down to the camera pallet. (See Fig. 1)
2. Standing in the forward crew compartment, looking up and forward from between the AC and Co-Pilot seats, locate the overhead console.
3. Immediately aft of the overhead console and between the Ejection seat mounting hardware, locate the two Phillips head panel screws that coincide with the two slots in the Forward Station Mounting Hardware camera pallet.
4. Remove these two screws, position the Forward Station Mounting Hardware with the support arms forward, and replace the two panel screws in their original holes by passing through the camera pallet. The panel screws are not always long enough to accomplish this. If the screws are not long enough, usually Bomber bench stock will have a large assortment in varying lengths.
5. Move the support arms so that the ends are approximately 4 to 6" apart at their ends. At the aft end of the overhead console, locate the Phillips head panel screws that coincide with the slots in the support arms. Remove these two screws and align the support arms with the screw holes in the overhead console. Replace the two screws by passing through the slots in the support arms. Again, the screws may not be long enough and new, longer screws will have to be procured.
6. Locate the Aft Station Mounting Hardware. This will be the "H - shaped" bracket with two half-moon mounting surfaces. For ease of installation, you may wish to remove the Camera mounting surface. This is accomplished by using a 3/4" wrench. The Sub-Assembly Mount will remain on the the polished tube. (See Fig. 2)
7. The Aft Station Mounting Hardware can be mounted at the OSO or DSO station. Since the installations are identical but reversed, we will deal only with the OSO side.
8. At the OSO station, locate the OSO Essential Circuit breaker Panel numbered 2455A02. Remove the spot light located above the circuit breaker panel by sliding the retaining ring towards the wall and pulling out on the light itself.
9. Locate the four Phillips head panel screws above the circuit breaker panel. Remove all four screws.

10. Position the Aft Station Mounting Hardware so that the four slots on the mounting surfaces line up with the screw holes.
11. Reinstall the four panel screws. Again, if the screws are not long enough, visit the local Bomber bench stock.
12. Reinstall the Camera Mount Surface, reverse the order of removal. (The slot in the camera mount surface should be to the rear of the bracket.)
13. Locate the Camera with the 50mm lens. This identification is made by looking at the back of the lens. The part number reads WV-LA50B.
14. The 50mm camera is to be installed at the Co-Pilot or AC side Camera mounting surface. If the AC's VSD is the display that is to be video taped, then mount the camera on the Co-Pilot side camera mount. This allows for cross aiming the cameras. (Meaning: The Co-Pilot camera aims at the AC VSD and vice-versa.) The camera mounts on TOP of the mounting surface not under it. Secure the camera to the mounting surface by using the 3/8" bolt attached to camera.
15. Locate the camera with the 25mm or 16mm lens. This identification is made by looking at the back of the lenses for part numbers WV-LA25B or WV-LA16B. (NOTE: The 25mm is the preferred lens to use.)
16. The 25mm or 16mm camera is to be installed at the OSO or DSO station. This camera is installed on the BOTTOM of the mounting surface using the 3/8" bolt.
17. Locate the cables. There should be three of them. Two video cables of different lengths and an interphone cable. Of the two video cables, the short one connects with the camera at the AC/Co-Pilot station. The longer video cable connects to the OSO camera and the interphone cable is plugged in at the IP (Instructor Pilot) position.
18. At the AC/Co-Pilot position camera, locate the "DC 12v In" power strip and Video output connector marked "Video". Remove the " - " and " + " connection screws. At one end of the video cable is a BNC connector and two solderless connectors. Connect the BNC connector to the video out jack. Connect the two solderless connectors as follows: Black to " - " and White to " + ". If these two solderless connectors are hooked up backwards, a fuse will blow behind the faceplate of the VCR. This will be discussed later.
19. Repeat step 18 for the OSO camera using the long video cable.

20. Locate the IP position interphone cable and control panel behind the Co-Pilot seat just forward of the crew compartment Galley.
21. Insure all pushbuttons are pushed in EXCEPT ICS. Insure that the MIC switch is in the NORM position and that the selector switch is in the ICS position. Rotate the ICS pushbutton to the 3 o'clock position. Rotate the UHF-1 pushbutton to the 1 o'clock position and rotate the UHF-2 pushbutton to the 11 o'clock position. All of the other pushbuttons should be rotated fully counter-clockwise.
22. Plug the male connector of our interphone cable into the female end of the IP interphone cable.
23. Place a piece of "duct tape" around the connection to prevent the crew from disconnecting the cable in flight.
24. Using the "duct tape", secure the Interphone cable and the AC/Co-Pilot video cable to the wall behind the Co-Pilots seat. Continue to secure the cables until they are routed into the OSO footwell.
25. Perform the same task on the OSO video cable. This can be accomplished by running the cable along the wall where the OSO side tray meets the wall. This cable can usually be pushed through the gap and will remain secure. If not, use the "duct tape" and run the cable through the same area. Run the cable under the OSOs table top and secure it there with cable ties. The cable is then run down the aisle wall into the OSO footwell securing it with "duct tape" as needed.
26. (If applicable) In the OSO footwell, secure the VCR cradles using the bolts in the floor and back wall of the footwell. This is accomplished by aligning the slotted holes of the cradles to the appropriate bolts in the floor and wall. If the VCR cradles are not available, use the "duct tape" to secure the VCRs to the floor of the footwell being careful not to obstruct the tape door on the top or the battery door on the left rear side. Be sure to allow enough room between the right VCR and the left VCR to allow replacement of the batteries.
27. Locate the 10-Pin end of the AC/Co-Pilot video cable. On the right side of the VCR locate the 10-Pin receptacle.
28. Carefully seat the 10-Pin connector into the VCR and secure by tightening.
29. Perform steps 27 and 28 using the OSO video cable 10-Pin connector on the second VCR.
30. Locate the small male pin end of the Interphone cable.

31. Insert the small male pin into the receptacle marked "MIC" on the VCR of choice. Note: It is preferred on the AC/Co-Pilot VCR.
32. If a Time Insertion Device (TID) is to be used, it is connected between a camera and a VCR. In this case the 10-Pin connector from the camera video cable is inserted into the 10-Pin receptacle of the TID. The TID Video cable 10-Pin connector is then connected to the VCR per step 28. See page 7 for set-up of TID.
33. Locate the Sony Watchman, AA batteries, and video cable.
34. Insert batteries into the Sony Watchman as per diagram on the battery access door.
35. Locate the Watchman video cable. It can be identified by having a small male pin on one end and two RCA plugs on the other.
36. Insert the male pin into the Watchman side labeled "A/V In".
37. On the same side of the VCR as the 10-Pin connector, locate the "Video Out" receptacle.
38. Insert the gray RCA plug into the "Video Out" receptacle. The other RCA plug is not used.
39. Locate two AC Adapters and insert them into the left rear door of the VCRs.
40. Locate the 30' Extension "Y" cable and the Power "Y" cable. (Orange sheathed)
41. Connect P2 of the Power "Y" cable to J8 of the MPDAS or PDAS Airborne Processor. (See wiring diagram at the end of the instructions.)
42. From the Power Distribution Unit (PDU), connect P3371 to J2 of the Power "Y" cable.
43. Connect P3 of the Power "Y" cable to J3 of the 30' Extension cable.
44. Connect P5 of the Extension cable to J1 of the AC Adapter.
45. Connect P4 of the Extension cable to J1 of the other AC Adapter.
46. Power up OAS and MPDAS or PDAS.
47. Slide the VCR power switch to on. A display should be present in the window above the power switch.

48. At the rear of the camera, locate the power switch and turn it on. A red LED will light on the front of the camera below the lens.

49. On the Watchman, slide the power switch to on.

50. After the Watchman has warmed up there should be a display.

51. When a display has been achieved, perform camera adjustments for best picture as follows:

- a. Loosen camera mounting surface for vertical adjustments.
- b. Loosen the 3/8" bolt that secures the camera to the mounting surface for horizontal adjustments.
- c. When vertical and horizontal adjustments are complete, tighten all bolts.

52. Focus the camera. NOTE: This should be accomplished with as little light as possible. This allows the Auto Iris function of the camera to "max" itself out to very little light and will maintain a focus over a wider range of light changes.

53. On the grip ring of the lens locate the small thumbscrew. It should only be finger tight.

54. Using the Camera System focus sheet, rotate the lens for the clearest display on the Watchman. If a focus sheet is unavailable, then place the front page of this guide against the display being video taped and focus the camera.

55. Tighten the focus ring thumbscrew finger tight ONLY.

56. On the faceplate of the VCR, press the EJECT button.

57. Insert a video cassette.

58. Run the VCR through its functions:

- a. Record
- b. Play
- c. Rewind

Each function should be displayed on the face plate.

59. Perform steps 47 through 58 for the second VCR and Camera.

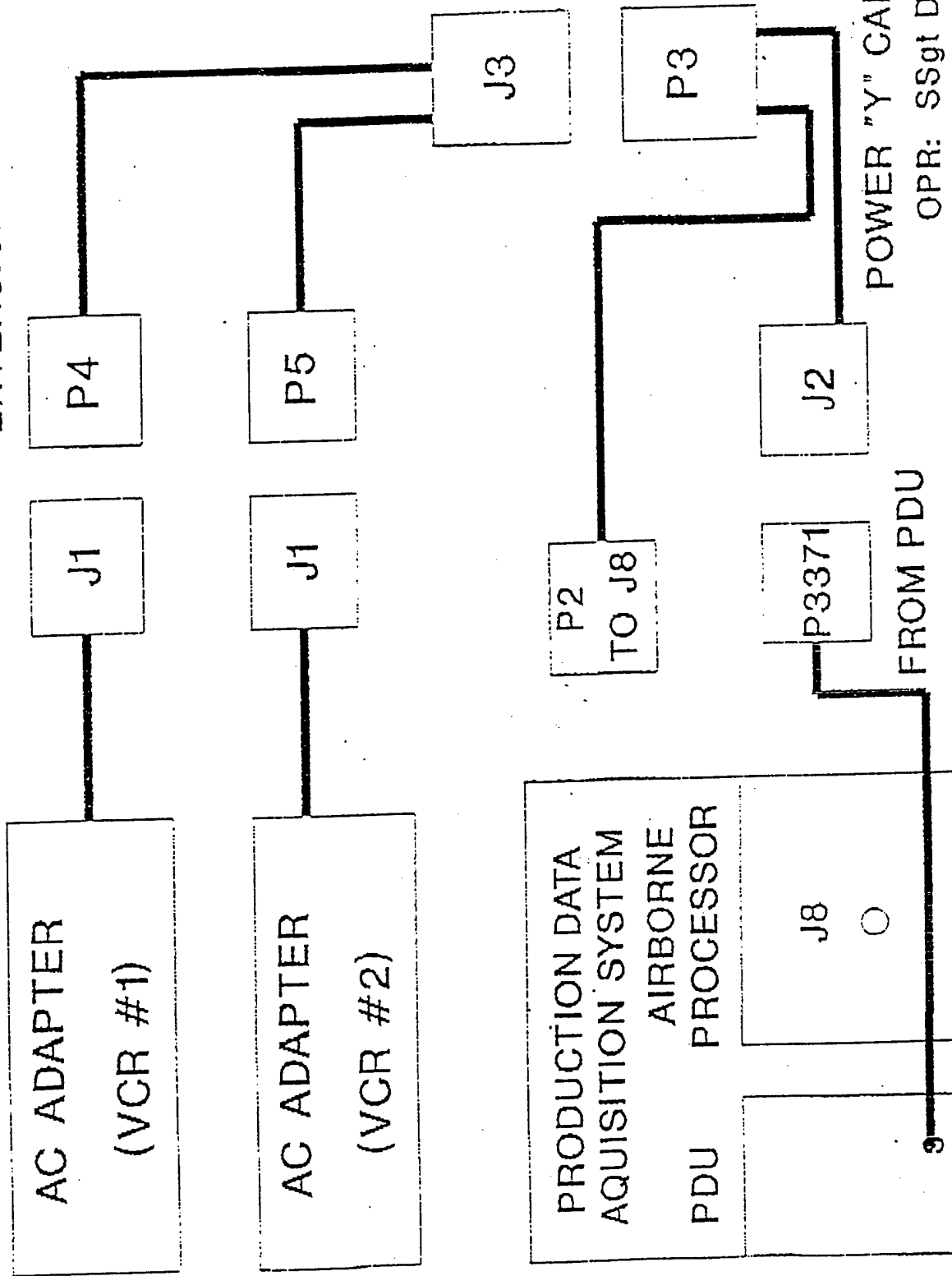
60. Remove tapes from VCRs.

61. Disconnect the Watchman.

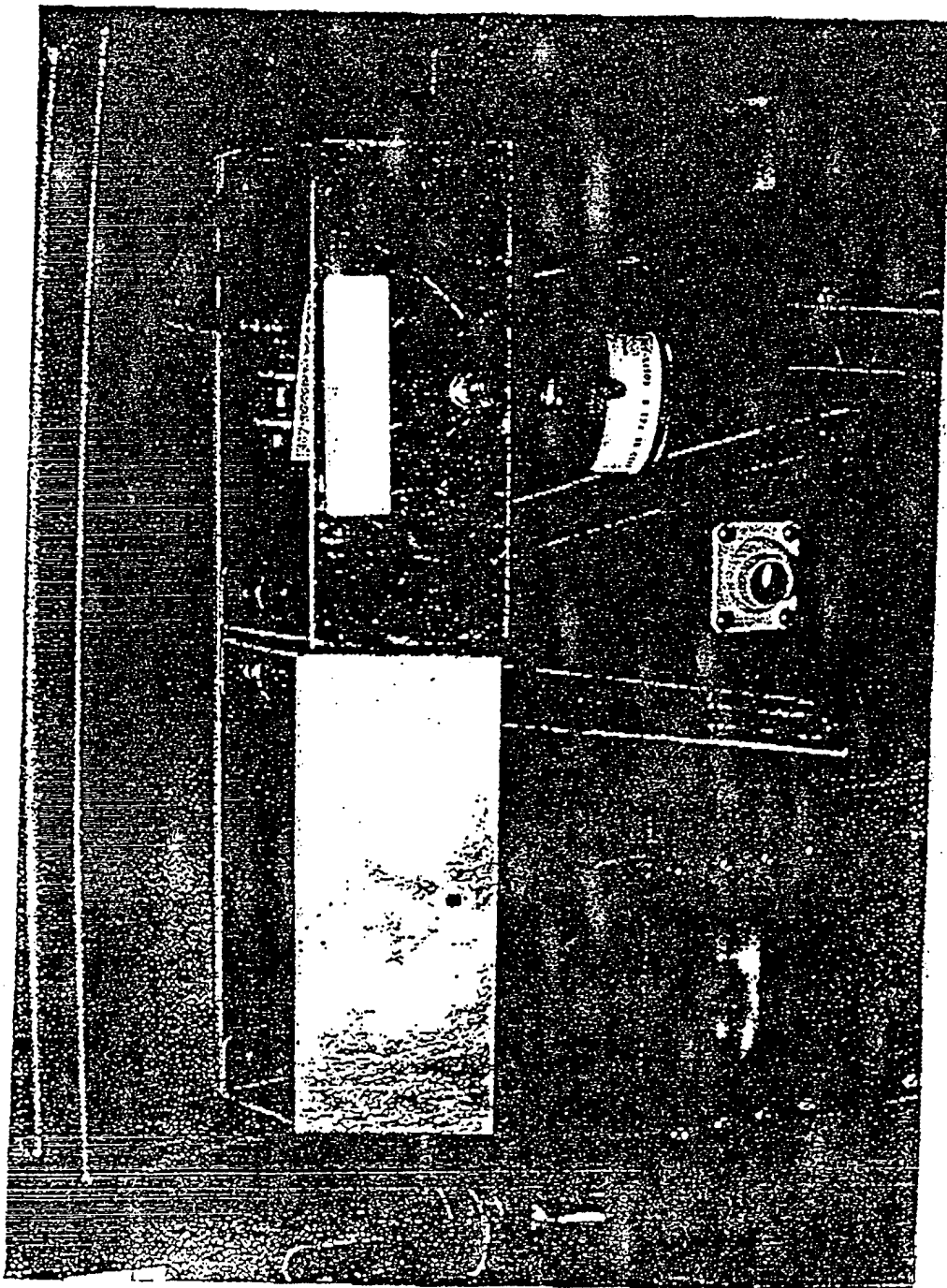
62. Turn VCR power off. (This will also turn the Cameras off)
63. Disconnect both AC Adapter J1s from P4 and P5.
64. Disconnect and remove VCRs as desired.
65. Perform steps 5 through 45 in reverse order for removal of system.
66. Replace the original panel screws.
67. Inspect crew compartment for F.O.D.

FUNCTIONAL WIRING DIAGRAM

EXTENSION "Y" CABLE



OPR: SSgt D. Hess



ATTACHMENT 4.

T-2 MOD PACKAGE FOR EBA

MODIFICATION PROJ. L

DATE 8 NOV 95

PAGE 1 OF 1

PAGES

THRU:
28 LG/CC
ELLSWORTH AFB, SDTO:
HQ ACC/LGF
LANGLEY AFB, VAFROM: (Organization, location, address and Code)
OC-ALC/LAB
TINKER AFB, OK 731451. TITLE
AIRCRAFT 85-0077 EMUX SYSTEM IN FLIGHT MONITORING

2. PROPOSED CLASS				3. TYPE PROPOSAL	
T-1	T-2	PERMANENT(P)	P-SAFETY	NEW PROPOSAL	COMMAND CERTIFICATION
	X				

4. UNIT CONTROL NO.	5. MAJCOM/TAF CONTROL NO.	6. TOTO NO.	7. MIP NO.
8. ECP NO.	9. MOD NO.	10. MANUFACTURER Rockwell International	11. OTHER IDENTIFIER/ SUGGESTION NO.

12. AFFECTED CONFIGURATION ITEM	13. ALSO AFFECTS					
		YES	NO		YES	NO
WOSTMS						
NOJN Digital Data Recorder	SUPPORT EQUIPMENT	✓		TECH DATA		
NSN L7550129-101	AIRCREW TRAINING DEVICES			SPARES		
WUC	MAINTENANCE TRAINING DEVICES/VISUAL AIDS			SOFTWARE	✓	
SRD CODE				OTHER		
OTHER						

14. ACTION OFFICER (Name, grade, military address and DSN number)		
ORIGINATING UNIT Chinh Truong, DSN 336-7447 OC-ALC/LAB Tinker AFB, OK 73145	MAJCOM Sgt Farrell, DSN 875-4887 17 BS MAOS Ellsworth AFB SD	ALC

16. PURPOSE (State the need or deficiency to be corrected and included expected results.)
A/C 85-0077 has experienced EMUX/Electrical interruptions on two flight for approximately 2 seconds. Extensive ground testing, performed on the aircraft to isolate an anomaly, has not been successful. In determining a cause of the anomaly if the anomaly occurs in flight, the Digital Data Recorder is required to be installed on aircraft to passively monitor and collect EMUX bus data during normal flight mission.

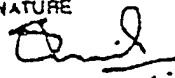
16. IMPACT (Urgency of need and impact if not satisfied)
The ground troubleshooting has not determined a cause of the anomaly

17. PROPOSED SOLUTION
Recording EMUX bus data with the subject recorder will aid in isolating a cause of the anomaly to either an EMUX system or Electrical system problem

3. KIT/UNIT COST		B. TO: MAJCOM		C. UNIT WORK HOURS		TOTAL WORK HOURS	
						OM USAF	
NO. OF CIG AFFECTED		F. LEAD TIME		G. TOTAL UNITS/KITS ROR		H. TOTAL USAF INVENTORY	
MAJCOM USAF				MAJCOM USAF			
19. LEVEL OF ACCOMPLISHMENT							
PRODUCTION		<input checked="" type="checkbox"/> ON MAINTENANCE		DEPOT		CONTRACTOR	
						OTHER	

20. REMARKS (If more space is needed, continue on plain paper and identify by item No.)
 Five (5) flight missions has been scheduled.

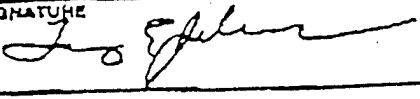
NOTE: No test procedures require for passive monitoring of EMUX busses during normal flightoperation only.

21. UNIT APPROVAL		
DATE 8 NOV 95	TYPE NAME, GRADE, TITLE AND DUTY PHONE Mr Suresh Chandra, GM 13 Avionics and Software Section Chief	SIGNATURE 

22. CCB ACTION HISTORY/MAJCOM REMARKS

23. MAJCOM CCB ACTION

24. MAJCOM CCB COORDINATION/CERTIFICATION						
DATE	OFFICE SYMBOL	NAME AND GRADE +	DATE	OFFICE SYMBOL	NAME AND GRADE	
6 NOV 95	QC-ALC/KAS	CHINH-TRUONG 55-12				
6 NOV 95	QC-ALC/LAS	7. 55-11				
6 NOV 95	QC-ALC/LAB	M. 55-11				
6 NOV 95	QC-ALC/LAB	6. 55-11				
6 NOV 95	QC-ALC/KAS	7. 55-11				
6 NOV 95	QC-ALC/KAS-1	8. 55-12				
6 NOV 95	QC-ALC/LAB	9. 55-14				


25. MAJCOM APPROVAL AUTHORITY		
DATE 11-6-95	CCB CHAIRPERSON (Type name, grade, office symbol and OSN) TERRY E. JOHNSON, Deputy Chief B-1B Systems Support Mgt Dh Directorate of Aircraft	SIGNATURE 

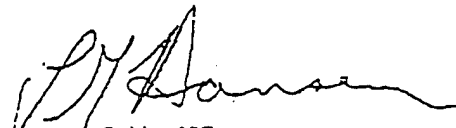
Rockwell Aerospace
North American Aircraft

DATE: November 3, 1995.
TO: Terry Johnson/Alvis Sanders/Suresh Chandra
LABE/B-1B SPO
(405) 736-7447
Fax (DAAC) 432-8555

Subject : Digital Data Recording Package flight worthy verification

The Digital Data Recording Package was utilized for the T-2 modification called Horizontal/Vertical Stabilizer Vibro-Acoustic Evaluation on B-1B Aircraft 85-0094. This was accomplished under Sustaining Engineering Contract F34801-94-C-0120. SWA#4-NT-041. The T-2 modification was approved by Oklahoma City SPO for testing in May 1995. The Digital Data Recording Package flew three test sorties with no structural or component degradation. The Digital Data Recording package is therefore recommended for use in the EMUX In Flight Monitoring Modification on B-1B Aircraft 85-0077. If further information regarding this matter is required please contact the undersigned.


FOR: J. A. Stotling
Manager, Flight Test Operations
Rockwell, NAAD - EAFB
(805) 277-6701


L. G. Hansen
Team Integrator
Structural and Flight Sciences
Rockwell, NAAD - Seal Beach
(310) 797-1594

Items Required for Installation of EMUX Bus Analyzer (EBA)

1. Remove CEB door.
2. Remove AFT Instructor's Seat.
3. Install EBA into AFT Instructor's seat location.
4. Install Modified CEB Door.
5. Route wiring from the EBA, through the modified door to both sides of the CEB; on the left side to the AGE connector 9211P14. The other harness over the door to the right to connector 9212P14, and to Transformer 3465T3.
6. Install wiring on transformer 3465T3 to the following terminals:

- A. Red wire to H1 ph A
- B. Green wire to H2 ph B
- C. White wire to H3 ph C
- D. Black wire to H0 neutral

Note: insure the terminals are not shorted together. Reinstall the terminal cover.

7. Connect wire harness to the EBA.
8. Remove the AFT Instructor's overhead cooling air diffuser.
9. Install air duct from the AFT Instructor's overhead cooling air diffuser to the bottom side of the EBA. Secure as required.
10. Engage all circuit breakers on the EBA.
11. Power up the EBA.
12. Functional check the system with a new Video tape installed.

EMIC

Prior to flying aircraft 85-0077 with the Instrumentation Package installed EMUX BUS ANALYZER (EBA), an Electrical Magnetic Interference Check (EMIC) must be performed. The purpose of this test is to ensure that the Instrumentation recording system installed on the aircraft does not interfere with aircraft Electrical systems. The following procedure will be completed and signed off prior to flight:

With the EBA installed and turned OFF, Aircrew members Perform Preflight checks up to TAXI. The aircraft will be configured back to APU's and number 2 and 4 Generators on line, (LM2).

Turn the EBA on and start the Recorder. Reperform the Preflight check up to TAXI. If the aircraft systems operate properly then the aircraft is ready to fly.

OPERATION OF EBA

The following procedure will be used to operate the EBA in flight:

Turn the EBA on by depressing the ON/ OFF button to ON. Located on the L.H. side of the Touch Screen. The button just below the ON button is to bright/ dim screen. Once boot up procedure and the self test has been completed, select the REC menu by tapping the REC button twice very quickly. This will change the color of the button and within twenty seconds (20) the TEAC will show running. Located in between the two lines about three quarters down the screen. Also the jammed time shows up on the same line to the right of TEAC ON/OFF.

B-1B Aircraft 85-0077 EMUX In Flight Monitoring

T-2 Modification Package

1) Application:

This T-2 Mod will be used on Aircraft 85-0077 only. At the conclusion of tests the aircraft will be returned to it's original configuration.

A kit supplied by Rockwell in the form of an Instrumentation Package, aka Digital Data Recording Package will be used for this Mod.

The Instrumentation Package will be installed at Ellsworth AFB. The installation will be a joint effort, using Air Force Maintenance Personnel and the Rockwell engineering staff already on site.

2) Purpose:

This T-2 Mod is to temporarily install in the aircraft, the Digital Data Recording Package, provide aircraft power and cooling air.

A special Test Plan / Procedure Sheet (TP/PS) will not be required.

This package will monitor and record EMUX activities during approx five (5) normal B-1B sorties. Set-up of the package will be accomplished by Rockwell engineers during preflight and just prior to takeoff, with engines running. Rockwell engineers on site will brief the DSO for in-flight operations and Master Power shutoff.

3) When to be accomplished:

As soon as possible, first flight is tentatively scheduled for 8 Nov 95.

4) What is required:

Rockwell will assemble the complete kit consisting of a combination of Rockwell and GFE assets. Ground testing has been on going since 31 Oct 95 with the Digital Data Recording Package. This same package will also be used for flight testing.

B-1B Aircraft 85-0077 EMUX In Flight Monitoring T-2 Modification Package

4) What is required: (continued)

The aircraft installation kit consists of:

- Digital Data Recording Package.
- Modified Central Equipment Bay Door.
- Cooling air adapter and hose.
- Power cable harness assembly.
- Test Data Cable Assemblies. (same as ground test cables)

5) How work is accomplished:

- Remove Aft Instructor Seat and Safety Belt Assembly.
- Remove Central Equipment Bay Door.
- Install Modified Central Equipment Bay Door.
- Install Digital Data Recording Package.
- Connect Test Data Cable Assemblies.
- Connect power cable to 3465T3 ACC No. 3 Transformer.

Route power and data cables from the Central Equipment Bay thru the Modified Central Equipment Bay Door to the Digital Data Recording Package. Exact routing path will be determined upon installation for best fit. This being such a short term modification, (approx 5 flights) permission is requested to deviate from the requirement to secure all wire runs (every 18" max) using clamps to pickup existing hardware or provide new hardware and utilize existing open holes as available. Instead, Rockwell would like to use String Tie only in place of clamps. where together with Engineering and Quality Assurance it is felt that the elimination of clamps will not pose a safety issue to the normal operation of the aircraft during this modification period.

6) Data List:

- L7550129 Digital Data Recording Package Assembly and Installation.
- L7550190 CPU Internal Wiring Diagram, Digital Data Package.
- L7550191 Digital Data Recording Package, Interface Diagram.

B-1B Aircraft 85-0077 EMUX In Flight Monitoring
T-2 Modification Package

7) Structural Analysis:

Will not be required for this T-2 Modification because this is the exact same installation that was used on a previous T-2 Modification, called, Horizontal/Vertical Stabilizer Vibro-Acoustic Evaluation. This was a SPO sponsored test on B-1B Aircraft 85-0094 in May 1995. Also, this installation is similar in design to current installations used to support B-1B Flight Testing at Edwards AFB. Structural analysis were done to support the above mentioned efforts.

8) Safety Analysis:

Will also not be required for this T-2 Modification for the same reasons the structural analysis is not.

9) EMI:

Rockwell suggests an EMIC (Engine Running Electro-magnetic Interference Check) is performed prior to first test flight.

10) Demodification:

A complete demodification will be accomplished at the conclusion of testing. All wiring, test equipment and hardware will be removed. All original equipment will be reinstalled per production requirements. As with the installation, support from Air Force Maintenance Personnel is required and supported by Rockwell engineers.

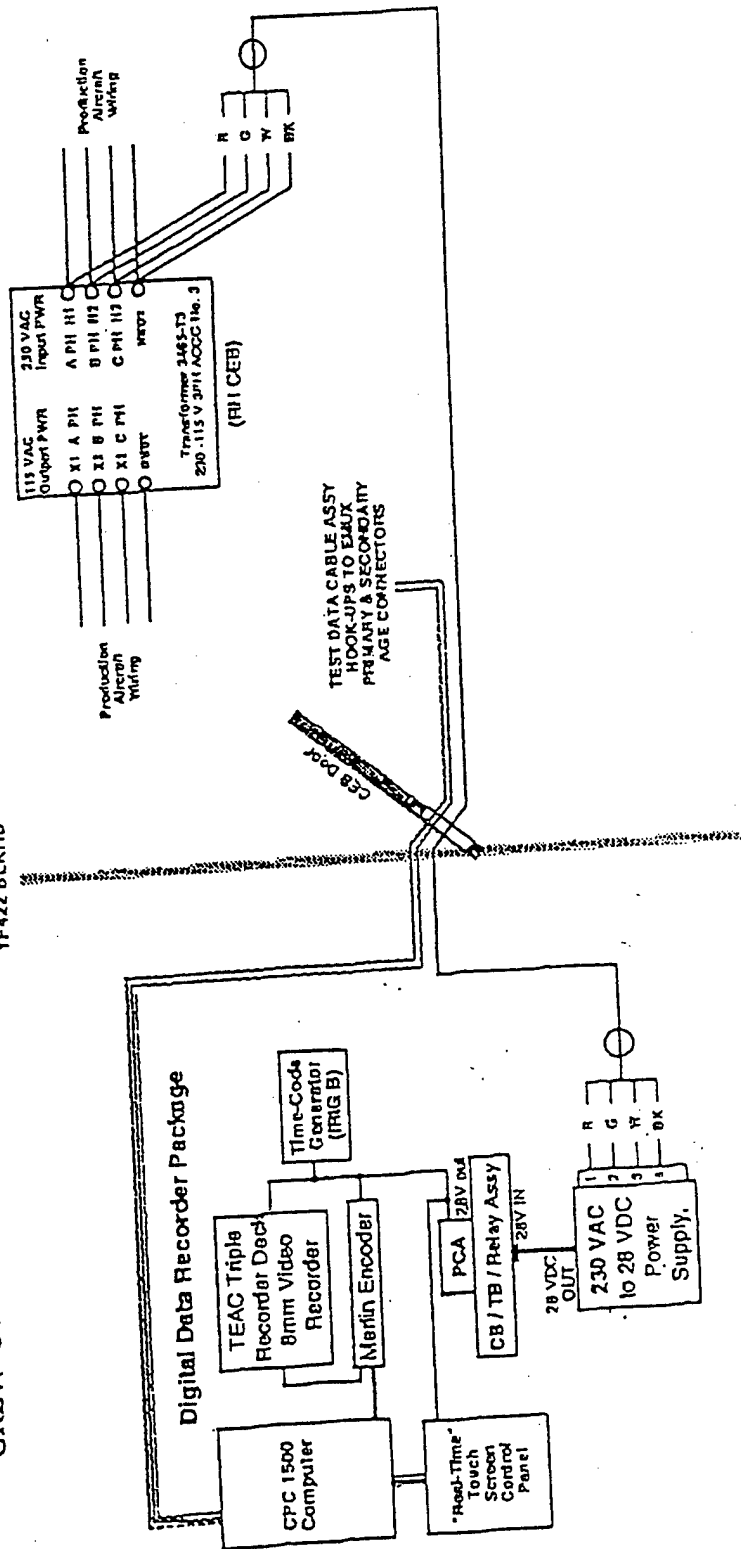
11) Attachments:

Letter of concurrence from Rockwell Engineering.
Digital Data Recording Package Block Diagram.
Crew Compartment Data Package Layout.

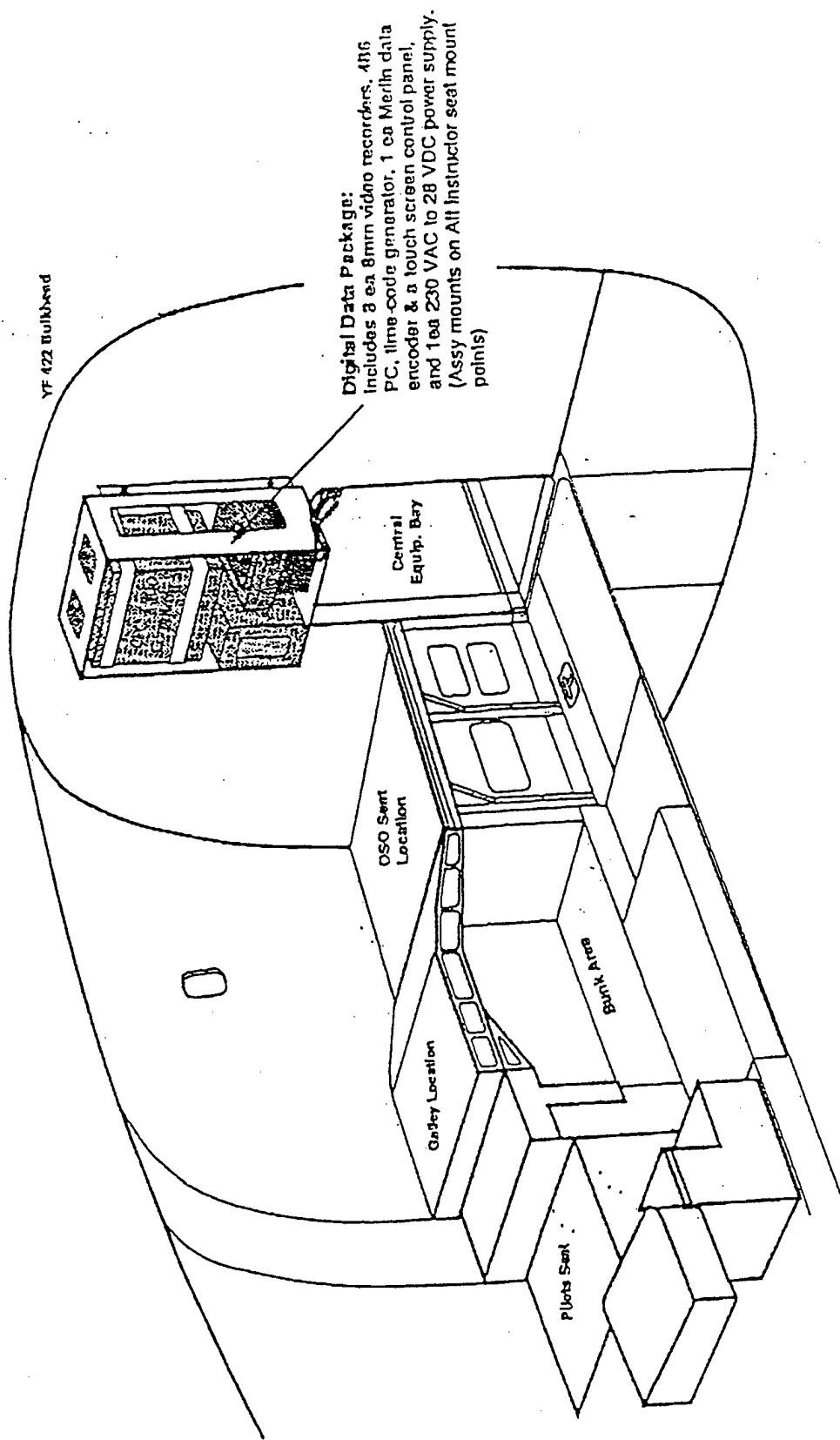
CREW COMPARTMENT

CEB

YF 422 BLKHD



Digital Data Recording Package Block Diagram



Crew Compartment Data Package Layout

7
6

2431P50A

W3010-0015-12

W3010-001-12 2431P10

A B C F G H J K N U V W Z AA

A B C F G H J K N U V W Z A*

THE ORIGINAL 2431J50 WILL BE DISMOUNTED, AND THE ADAPTER WILL BE MOUNTED IN ITS PLACE. So 2431P50 WILL MATE TO 2431J50A AND 2431P50A WILL MATE TO 2431J50. THE HARNESS WILL BE SECURED FOR FLIGHT.

Atch

T-2 MOD PACKAGE/OC-LAB96-

EMUX SYSTEM INFLIGHT MONITORING

1st Ind

DATE:

12/13/96

From: LABEF

TO: OC-ALC/LABEC

Recommend the above referenced item be:

APPROVED AS WRITTEN ☒ APPROVED W/COMMENTS ☐ DISAPPROVED W/COMMENTS ☐ NO IMPACT ☐

Comments: WIRING RUNS MUST ACCOMMODATE THE NEED FOR PRESSURIZATION, IF REQUIRED.

Gregory C. Hillert
Signature

Signature (CCB Member)

96/12/12

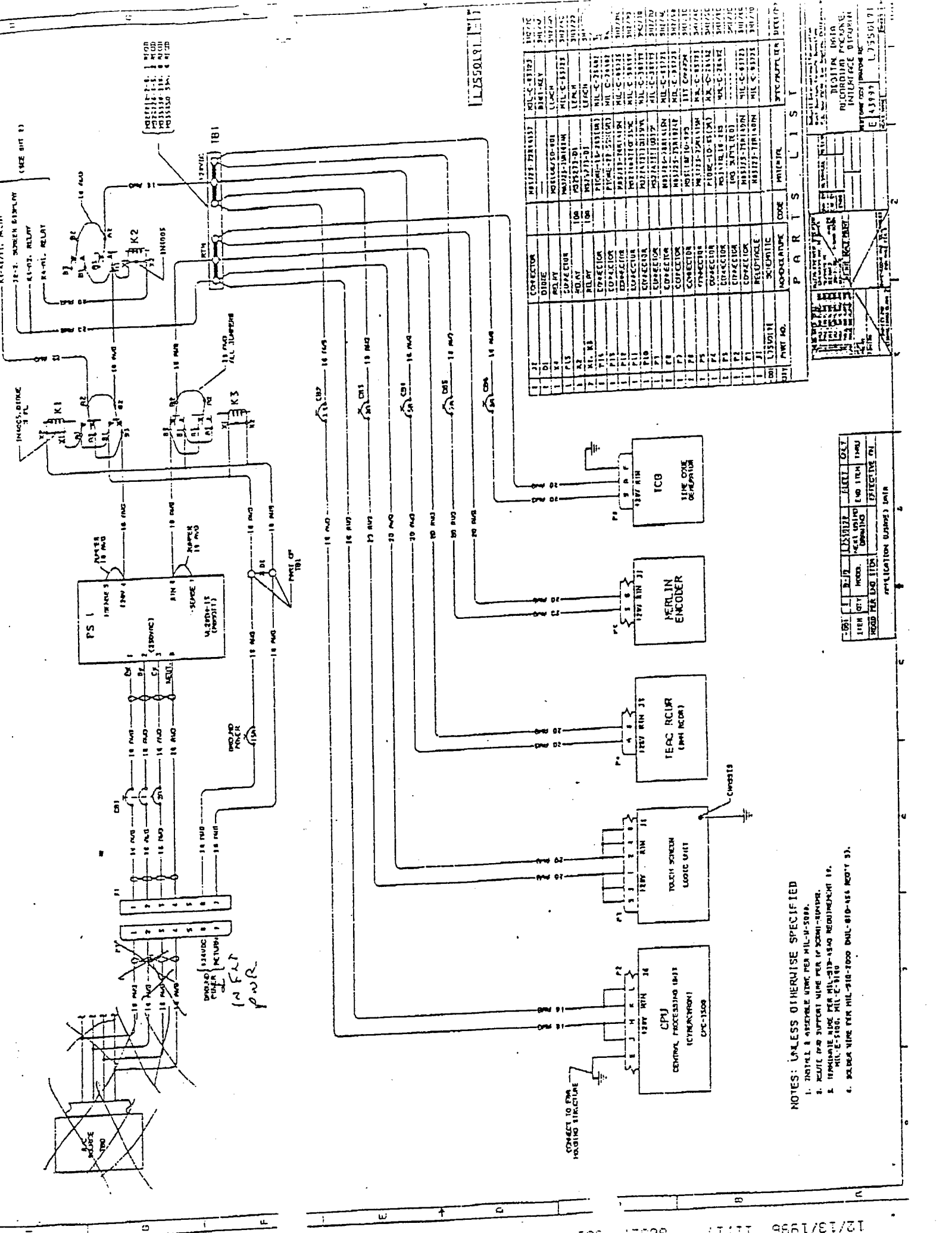
To: William Pruitt
Boeing North American
Midwest City, Ok.

From: Barney Eaton
Boeing North American
Seal Beach, Ca.

Subject: Use of B-1B Forward Battery for Data Bus Analyzer (DBA) Power

An analysis of the load on the subject battery bus has been performed and the bus can support the additional 13 amperes required by the DBA. The assumption is that the aircraft (85-0085) has the Aft DC Modification incorporated and the Forward Transformer Rectifier (T/R) is operational.

The pre-Aft DC Mod battery does not have the capacity to support the additional load and the loss of the T/R will limit the time that the DBA can operate before draining the battery.



NOTES: UNLESS OTHERWISE SPECIFIED
 1. INSTALL & SERVICE WIRE PER MIL-15501.
 2. RELAY P.D. SUPPORT WIRE PER IF SCMI-BUNDR.
 3. TERMINAL BLOCK PER MIL-15501-1540 REQUIREMENT 15.
 4. SOLDER WIRE PER MIL-15501-1540 DUAL-810-454 REQ'T 33.

APPLICATION (GROUP) DATA

ITEM	QTY	MOD.	REMARKS	DATE	BY
1	1	1	1	1	1

PARTS LIST

QTY	PART NO.	DESCRIPTION	CODE	REMARKS
1	15501-1	RELAY		
1	15501-2	RELAY		
1	15501-3	RELAY		
1	15501-4	RELAY		
1	15501-5	RELAY		
1	15501-6	RELAY		
1	15501-7	RELAY		
1	15501-8	RELAY		
1	15501-9	RELAY		
1	15501-10	RELAY		
1	15501-11	RELAY		
1	15501-12	RELAY		
1	15501-13	RELAY		
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1	15501-88	RELAY		
1	15501-89	RELAY		
1	15501-90	RELAY		
1	15501-91	RELAY		
1	15501-92	RELAY		
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1	15501-96	RELAY		
1	15501-97	RELAY		
1	15501-98	RELAY		
1	15501-99	RELAY		
1	15501-100	RELAY		

REVISION DATA

REV	DATE	DESCRIPTION
1	11/17/96	INITIAL DESIGN
2	11/17/96	REVISION 1
3	11/17/96	REVISION 2
4	11/17/96	REVISION 3
5	11/17/96	REVISION 4
6	11/17/96	REVISION 5
7	11/17/96	REVISION 6
8	11/17/96	REVISION 7
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14	11/17/96	REVISION 13
15	11/17/96	REVISION 14
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96	11/17/96	REVISION 95
97	11/17/96	REVISION 96
98	11/17/96	REVISION 97
99	11/17/96	REVISION 98
100	11/17/96	REVISION 99
101	11/17/96	REVISION 100

[illegible]

SPICE PART No.
4H2GA & 2J319 RAYCAM
2H2GA OR 2H2GA & 1H6GA = 323758 AMP OR 2-34318-1 AMP

Post-It™ brand fax transmittal memo 7874		# of pages > 5
To	SA [redacted]	From RUTH MALKANOA
Cc	JON.	On BNA, S.B.
Dept		Phone 97-2439
Fax	8-397-6860	Fax 97-1223

85-0085 PROBLEM

- INSTALL EBA
- VERIFY OPERATION OF EBA
- EMUX DATA BUS CHECK
- EMUX VERIFICATION
- GENERATOR WIRING CHECKS
- DIFFERENTIAL FAULT PROTECTION
- GROUND RUN; AIRBORNE
- LOOK AT DATA

ATTACHMENT 5.

POC LIST

<u>Name</u>	<u>Phone #</u>	<u>Organization</u>	<u>Function</u>
Maj Sam Kyle	7-6619	10 FLTS	RTO
Lt Randy Liebl	6-5487	LAB-1	Test Manager
Capt Rene Little	6-2747	LAB-1	Alt Test Manager
Lt Jon Bradford	6-4431	LABEA	Engineer
Mr. Mike Vesta	6-2888	LAPPB	LAP POC
Mr. William Pruitt	6-2816	Boeing	Contractor POC
Mr. Charlie Asada	6-2816	Boeing	Contractor Engineer
Lt Dave Parlotz	781-8292	49 TESTS	Alt Camera POC
MSgt Jeff Heckerson	781-8292	49 TESTS	Camera POC
Mr. John York	6-2816	Boeing	EBA POC
Mr. Andy Horney	6-2816	Boeing	Alt EBA POC

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